# BROCADE VDX 6720 DATA CENTER SWITCH

## DATA CENTER

## Revolutionizing the Way Data Center Networks Are Built

### HIGHLIGHTS

- Offers high-performance 10 Gigabit Ethernet (GbE) data center LAN ports in a fixed port switch configuration
- Provides industry-leading performance and ultra-low latency through wire-speed ports with 600 nanosecond port-to-port latency and hardware-based Inter-Switch Link (ISL) trunking
- Simplifies network architectures and enables cloud computing by delivering Brocade VCS Fabric technology
- Provides Ethernet storage connectivity for Fibre Channel over Ethernet (FCoE), iSCSI, and NAS
- Simplifies virtualization server management by providing Virtual Machine (VM) mobility with dynamic server profile configuration

Seeking better ways to build clouds and virtualized data centers, today's IT organizations are turning to high-performance networking solutions that increase flexibility through leading-edge technologies. The Brocade® VDX™ 6720 Data Center Switch is a high-performance 10 Gigabit Ethernet (GbE) fixed port switch with LAN ports that supports the most demanding business applications. It is specifically designed to improve network utilization, maximize application availability, increase scalability, and dramatically simplify network architecture in virtualized data centers. With a rich set of Layer 2 features, the Brocade VDX 6720 is an ideal platform for traditional Top-of-Rack (ToR) switch deployments.

Brocade VCS™ Fabric technology enables organizations to build data center Ethernet fabrics—revolutionizing the design of Layer 2 networks and providing an intelligent foundation for cloud-optimized data centers (see Figure 1). The Brocade VDX 6720 can be easily deployed in VCS fabric mode with an add-on software license.

The Brocade VDX 6720 is available in two models—the 2U Brocade VDX 6720-60 with 60 10 GbE LAN ports, and the 1U Brocade VDX 6720-24 with 24 10 GbE LAN ports. Both models provide Ethernet storage connectivity for Fibre Channel over Ethernet (FCoE), iSCSI, and NAS.

The Brocade One™ strategy helps simplify networking infrastructures through innovative technologies and solutions. Brocade VDX 6720 Data Center Switches support this strategy by simplifying network architecture while increasing network performance and resiliency with Ethernet fabrics.

BROCADE

## COMPREHENSIVE LAYER 2 LAN CAPABILITIES FOR CLASSIC ToR SERVER DEPLOYMENTS

The Brocade VDX 6720 supports a rich set of traditional Layer 2 Ethernet protocols and features, including:

- **Comprehensive Layer 2 LAN capabilities:** Supports protocols such as Link Aggregation Control Protocol (LACP) and 802.1Q. The Brocade VDX 6720 is also ready for IPv4/IPv6 Layer 3 routing capabilities, which can be implemented in a future Brocade Network OS release.
- **High-bandwidth efficiency across trunks:** Maximizes performance with hardware-based ISL trunking and wire-speed ports with ultra-low port-to-port latency.
- **Lowest power consumption:** Features superior size and the industry's lowest power consumption—imperative in today's data centers.
- **Scale-out solution for virtualized data centers:** Enables dynamic, large-scale server virtualization deployments in private (IT customers within an enterprise) and public (external customers of managed service providers) clouds with proven scalability capabilities and Layer 2 Equal Cost Multi-Path (ECMP).
- **Local switching:** Delivers high performance for intra-rack traffic in virtualized environments, providing ultra-low latency of 600 nanoseconds for the same ASIC on the switch. This helps organizations design a network with no oversubscription for deterministic network performance and improved application response times, making the Brocade VDX 6720 ideal for performance-demanding environments.

## AN INTELLIGENT FOUNDATION FOR CLOUD COMPUTING

Brocade VCS Fabric technology is an innovative technology that enables organizations to build high-performance cloud-optimized data centers while preserving existing network designs and cabling, and gaining active-active server connections. For scale-out fabric architectures, Brocade VCS Fabric technology allows organizations to flatten network designs, provide Virtual Machine (VM) mobility without network reconfiguration, and manage the entire fabric more efficiently. Learn more about Brocade VCS Fabric technology at www.brocade.com/vcs.

## ETHERNET STORAGE CONNECTIVITY

The Brocade VDX 6720 connects to FCoE, iSCSI, and NAS storage. The FCoE feature can be turned on with an add-on software license.

### Server and Storage Virtualization Automation Support

Brocade VCS Fabric technology offers unique features to support virtualized server and storage environments. During a VM migration, network switch ports must be dynamically configured to ensure that the VM traffic experiences consistent policies and configurations (see Figure 2). The Brocade Automatic Migration of Port Profiles (AMPP) feature enables a seamless migration. Port profiles and MAC address mapping are created on any switch in the fabric. This mapping provides the logical flow for traffic from the source port to the destination port. As a VM migrates, the destination port in the fabric learns of the MAC move and automatically activates the port profile configuration.

Brocade VM-aware network automation provides secure connectivity and full visibility to virtualized server resources with dynamic learning and activation of port profiles. By communicating directly with VMware vCenter, it eliminates manual configuration of port profiles and supports VM mobility across VCS fabrics within a data center. In addition to providing protection against VM MAC spoofing, AMPP and VM-aware network automation enable organizations to fully align virtual server and network infrastructure resources, and realize the full benefits of server virtualization.

### Proactive Monitoring

Brocade Fabric Watch is an innovative switch health monitoring feature available on the Brocade VDX 6720. Fabric Watch monitors the health of certain switch components and, based on the threshold set, declares each component as marginal or down.

## BROCADE GLOBAL SERVICES

Brocade Global Services has the expertise to help organizations build scalable, efficient cloud infrastructures. Leveraging 15 years of expertise in storage, networking, and virtualization, Brocade Global Services delivers world-class professional services, technical support, and education services, enabling organizations to maximize their Brocade investments, accelerate new technology deployments, and optimize the performance of networking infrastructures.

## CLOUD-OPTIMIZED NETWORK ACQUISITION

Brocade helps organizations easily address their information technology requirements by offering flexible network acquisition and support alternatives to meet their financial needs. Organizations can select from purchase, lease, and Brocade Network Subscription options to align network acquisition with their unique capital requirements and risk profiles.

## MAXIMIZING INVESTMENTS

To help optimize technology investments, Brocade and its partners offer complete solutions that include professional services, technical support, and education. For more information, contact a Brocade sales partner or visit www.brocade.com.

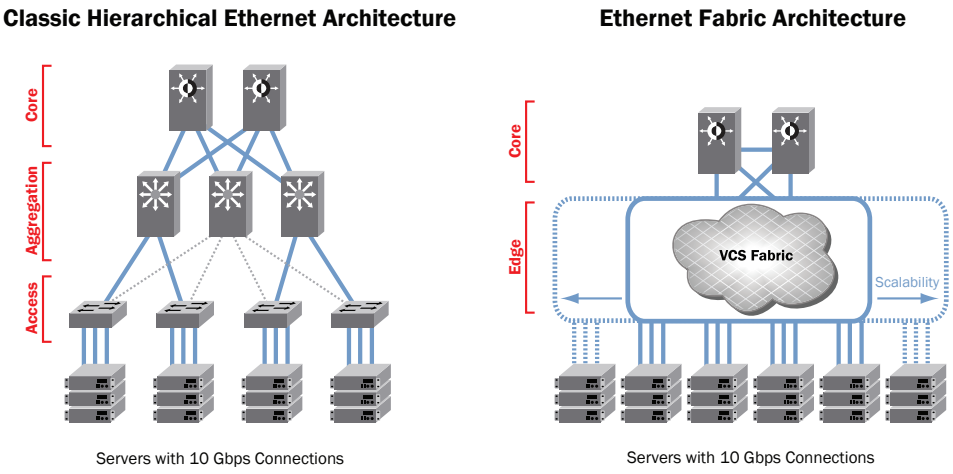


**Figure 1.**
Compared to classic Ethernet architectures, Ethernet fabrics allow all paths to be active and provide greater scalability—while reducing management complexity.

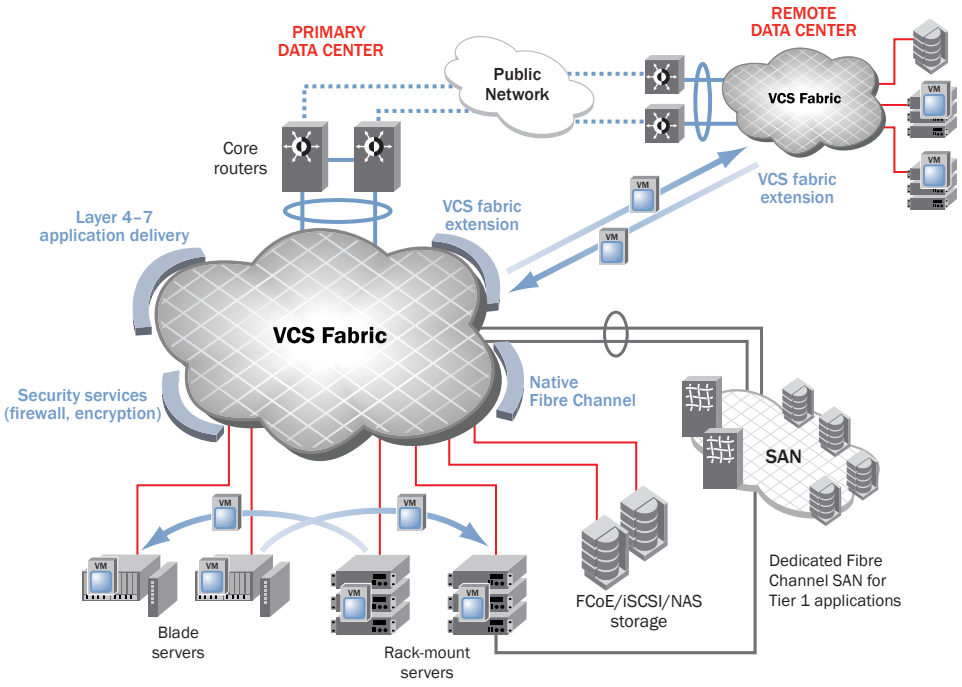


**Figure 2.**
Brocade VCS Fabric technology simplifies the network architecture, enables unified storage connectivity, improves VM mobility, and allows the seamless insertion of services.

## WHAT IS AN ETHERNET FABRIC?

Compared to classic hierarchical Ethernet architectures, Ethernet fabrics provide higher levels of performance, utilization, availability, and simplicity. They are designed to be:

- **Flatter:** Eliminates the need for Spanning Tree Protocol (STP), while being completely interoperable with existing Ethernet networks
- **Flexible:** Can be architected in any topology to best meet the needs of any variety of workloads
- **Resilient:** Uses multiple "least cost" paths for high performance and high reliability
- **Elastic:** Scales easily up and down as needed

More advanced Ethernet fabrics borrow further from Fibre Channel fabric constructs:

- They are self-forming and function as a single logical entity, in which all switches automatically know about each other and all connected physical and logical devices.
- Management can then be domain-based rather than device-based, and defined by policy rather than repetitive procedures.
- These features, along with virtualization-specific enhancements, make it easier to explicitly address the challenges of VM automation within the network, thereby facilitating better IT automation.

Protocol convergence, such as Fibre Channel over Ethernet (FCoE), may also be a feature, intended as a means of better bridging LAN and Storage Area Network (SAN) traffic.

Learn more about Ethernet fabrics at www.brocade.com/ethernet-fabric.

## BROCADE VDX 6720 FEATURE OVERVIEW

| | Brocade VDX 6720-24 | Brocade VDX 6720-60 |
|---|---|---|
| Switching bandwidth (data rate, full duplex) | 480 Gbps | 1200 Gbps |
| Port-to-port latency | 600 nanoseconds within 10-port group | 600 nanoseconds within 10-port group |
| Form factor | 1U | 2U |
| Dimensions and weight | Width: 42.88 cm (16.88 in.)<br>Height: 4.32 cm (1.70 in.)<br>Depth: 38.10 cm (15.00 in.)<br>Weight: 7.30 kg (16.10 lb) | Width: 42.88 cm (16.88 in.)<br>Height: 8.89 cm (3.50 in.)<br>Depth: 43.18 cm (17.00 in.)<br>Weight: 15.88 kg (35.00 lb) |
| 1/10 GbE SFP+ ports | 24 | 60 |
| Ports on Demand (PoD) increments | 16, 24 | 40, 50, 60 |
| Power supplies | Two hot-swappable, load-sharing | Two hot-swappable, load-sharing |
| Cooling fans | N+1 redundant, integrated into power supplies | N+1 redundant, three hot-swappable fan units |

## BROCADE VDX 6720 SPECIFICATIONS

| Scalability Information[1] | | |
|---|---|---|
| Connector options | 1 GbE copper SFP options<br>1000Base-SX and 1000Base-LX<br>10 Gbps SFP+ options: 1/3/5 m direct-attached copper (Twinax)<br>10 GbE SR and 10 GbE LR<br>Out-of-band Ethernet management: RJ-45 (fixed)<br>Remote lights-out management: 10/100/1000 BaseT Ethernet<br>Console management: RJ45 to RS-232 (fixed)<br>Firmware and diagnostic: USB | |
| Maximum VLANs | 4096 | |
| Maximum MAC addresses | 32,000 | |
| Maximum port profiles (AMPP) | 256 | |
| Maximum Layer 2 multicast groups | 2000 | |
| Maximum Spanning Tree instances | 32 | |
| Maximum per-port priority pause level | 8 | |
| Maximum LAG groups in a VCS fabric | 512 | |
| Maximum members in a standard LAG | 16 | |
| Maximum MAC addresses in a VCS fabric | 30,000 | |
| Maximum switches in a VCS fabric | 24 | |
| Maximum ECMP paths in a VCS fabric | 8 | |
| Maximum trunk members for VCS fabric ports | 8 | |
| Maximum switches across which a vLAG can span | 4 | |
| Maximum members in a vLAG | 16 | |
| Maximum jumbo frame size | 9208 bytes | |
| Queues per port | 8 | |
| DCB Priority Flow Control (PFC) classes | 8 | |
| Operating system | Brocade Network OS | |
| Layer 2 switching features | • MAC Learning and Aging<br>• Static MAC Configuration<br>• Link Aggregation Control Protocol (LACP) 802.3ad/802.1AX<br>• Virtual Local Area Networks (VLANs)<br>• VLAN Encapsulation 802.1Q<br>• Rapid Spanning Tree Protocol (RSTP) 802.1D<br>• Multiple Spanning Tree Protocol (MSTP) 802.1s<br>• Per-VLAN Spanning Tree (PVST+/PVRST+) | • STP PortFast and PortFast BDPU Guard<br>• STP Root Guard<br>• Layer 2 Access Control Lists (ACLs)<br>• Address Resolution Protocol (ARP) RFC 826<br>• IGMP v1/v2 Snooping<br>• Pause Frames 802.3x |
| Brocade VCS Fabric technology features | • Automatic Fabric Formation<br>• Distributed Fabric Services<br>• Transparent LAN Services<br>• Virtual Link Aggregation Group (vLAG) spanning multiple physical switches<br>• Switch Beaconing | • Distributed Configuration Management<br>• Transparent Interconnection of Lots of Links (TRILL)<br>• Equal Cost Multi-Path (ECMP)<br>• Automatic Migration of Port Profiles (AMPP)<br>• VM-aware network automation |
| DCB features | • Priority-based Flow Control (PFC) 802.1Qbb<br>• Enhanced Transmission Selection (ETS) 802.1Qaz | • Data Center Bridging eXchange (DCBX)<br>• DCBX Application Type-Length-Value (TLV) for FCoE and iSCSI |
| FCoE features | • Multihop Fibre Channel over Ethernet (FCoE); requires Brocade VCS Fabric technology<br>• FC-BB5 compliant Fibre Channel Forwarder (FCF)<br>• Native FCoE forwarding | • End-to-end FCoE (initiator to target)<br>• FCoE Initialization Protocol (FIP) v1 support for FCoE devices login and initialization |
| Quality of Service (QoS) | • Eight priority levels for QoS<br>• Class of Service (CoS) 802.1p | • Per-port QoS configuration<br>• Scheduling: Strict Priority (SP), Shaped Deficit Weighted Round-Robin (SDWRR) |
| Switch health monitoring | • Fabric Watch monitoring and notification | |

[1] *Please refer to the latest version of the release notes for the most up-to-date scalability numbers.*

## BROCADE VDX 6720 SPECIFICATIONS (CONTINUED)

| | |
|---|---|
| **Management** | |
| Management and control | • IPv4/IPv6 management<br>• Industry-standard Command Line Interface (CLI)<br>• Remote lights out management (future update)<br>• In-band management<br>• Link Layer Discovery Protocol (LLDP) 802.1AB<br>• Switched Port Analyzer (SPAN)<br>• Telnet<br>• SNMP v1/v2<br>• sFlow RFC 3176 |
| Security | • Port-based Network Access Control 802.1X<br>• RADIUS<br>• TACACS+<br>• Secure Shell (SSHv2)<br>• BPDU Drop |
| **Mechanical** | |
| Enclosure | Front-to-rear, rear-to-front airflow; 1U, 19-inch EIA-compliant; power from non-port side |
| **Environmental** | |
| Temperature | Operating: 0°C to 40°C (32°F to 104°F)<br>Non-operating and storage: –25°C to 70°C (–13°F to 158°F) |
| Humidity | Operating: 10% to 85% non-condensing<br>Non-operating and storage: 10% to 90% non-condensing |
| Altitude | Operating: Up to 3000 meters (9842 feet)<br>Non-operating and storage: Up to 12 kilometers (39,370 feet) |
| Shock | Operating: 20 g, 6 ms half-sine<br>Non-operating and storage: Half-sine, 33 g 11 ms, 3/eg Axis |
| Vibration | Operating: 0.5 g sine, 0.4 grms random, 5 to 500 Hz<br>Non-operating and storage: 2.0 g sine, 1.1 grms random, 5 to 500 Hz |
| Airflow | Brocade VDX 6720-24<br>Maximum: 53 CFM<br>Nominal: 35 CFM<br>Brocade VDX 6720-60<br>Maximum: 115 CFM<br>Nominal: 76 CFM |
| Heat dissipation | 450 BTU/hr (24-port switch); 1126 BTU/hr (60-port switch) |
| **Power** | |
| Power supplies | Two internal, redundant, field-replaceable, load-sharing AC power supplies |
| Power inlet | C13 |
| Input voltage | 85 to 256 VAC nominal |
| Input line frequency | 47 to 63 Hz |
| Inrush current | 50 amps max |
| Maximum current | 3.5 amps max (24-port switch); 7 amps max (60-port switch) |
| Maximum power consumption | 132 watts (24-port switch); 330 watts (60-port switch) |

## Safety Compliance

- UL 60950-1 Second Edition
- CAN/CSA-C22.2 No. 60950-1 Second Edition
- EN 60950-1 Second Edition
- IEC 60950-1 Second Edition
- AS/NZS 60950-1
- GB4943
- GB9254

## Electromagnetic Emission

- 47CFR Part 15 (CFR 47) Class A
- AS/NZS CISPR22 Class A
- CISPR22 Class A
- EN55022 Class A
- ICES003 Class A
- VCCI Class A
- EN61000-3-2
- EN61000-3-3
- KN22 Class A

## Immunity

- EN55024
- CISPR24
- EN300386
- KN 61000-4 series

## Environmental Regulatory Compliance

- RoHS-6 (with lead exemption) Directive 2002/95/EC

## Standards Compliance

The Brocade VDX 6720 products conform to the following Ethernet standards:

- IEEE 802.1D Spanning Tree Protocol
- IEEE 802.1s Multiple Spanning Tree
- IEEE 802.1w Rapid reconfiguration of Spanning Tree Protocol
- IEEE 802.3ad Link Aggregation with LACP
- IEEE 802.3ae 10G Ethernet
- IEEE 802.1Q VLAN Tagging
- IEEE 802.1p Class of Service Prioritization and Tagging
- IEEE 802.1v VLAN Classification by Protocol and Port
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- IEEE 802.3x Flow Control (Pause Frames)

The following draft versions of the Data Center Bridging (DCB) and Fibre Channel over Ethernet (FCoE) standards are also supported on the Brocade VDX 6720:

- IEEE 802.1Qbb Priority-based Flow Control
- IEEE 802.1Qaz Enhanced Transmission Selection
- IEEE 802.1 DCB Capability Exchange Protocol (Proposed under the DCB Task Group of IEEE 802.1 Working Group)
- FC-BB-5 FCoE (Rev 2.0)

## BROCADE VDX 6720 ORDERING INFORMATION

| SKU | Description | Comments |
|---|---|---|
| BR-VDX6720-16-F | Brocade VDX 6720, 16P SFP+, AC, non-port side exhaust airflow | Base SKU |
| BR-VDX6720-16-R | Brocade VDX 6720, 16P SFP+, AC, port side exhaust airflow | Base SKU |
| BR-VDX6720-24-F | Brocade VDX 6720, 24P SFP+, AC, non-port side exhaust airflow | Base SKU |
| BR-VDX6720-24-R | Brocade VDX 6720, 24P SFP+, AC, port side exhaust airflow | Base SKU |
| BR-VDX6720-40-F | Brocade VDX 6720, 40P SFP+, AC, non-port side exhaust airflow | Base SKU |
| BR-VDX6720-40-R | Brocade VDX 6720, 40P SFP+, AC, port side exhaust airflow | Base SKU |
| BR-VDX6720-60-F | Brocade VDX 6720, 60P SFP+, AC, non-port side exhaust airflow | Base SKU |
| BR-VDX6720-60-R | Brocade VDX 6720, 60P SFP+, AC, port side exhaust airflow | Base SKU |
| BR-VDX6720-24POD-01 | 8-port PoD license for Brocade VDX 6720-32 | Software orderable |
| BR-VDX6720-60POD-01 | 10-port PoD license for Brocade VDX 6720-76 | Software orderable |
| BR-VDX6720-24VCS-01 | VCS software license for Brocade VDX 6720-16, Brocade VDX 6720-24 | Software orderable |
| BR-VDX6720-60VCS-01 | VCS software license for Brocade VDX 6720-40, Brocade VDX 6720-60 | Software orderable |
| XBR-250WPSAC-F | FRU 250W ACPS/FAN, non-port side exhaust airflow | FRU |
| BR-VDX 6720-24FCOE-01 | FCoE software license for 16- and 24-port SKU | Software orderable |
| BR-VDX 6720-60FCOE-01 | FCoE software license for 40- and 60-port SKU | Software orderable |
| XBR-250WPSAC-R | FRU 250W ACPS/FAN, port side exhaust airflow | FRU |
| XBR-250WPSAC-F | FRU 250W ACPS/FAN, non-port side exhaust airflow | FRU |
| XBR-500WPSAC-R | FRU 500W ACPS, port side exhaust airflow | FRU |
| XBR-500WPSAC-F | FRU 500W ACPS, non-port side exhaust airflow | FRU |
| XBR-FAN-80-F | FRU FAN, 80MM, non-port side exhaust airflow | FRU |
| XBR-FAN-80-R | FRU FAN, 80MM, port side exhaust airflow | FRU |
| RPS9 | 500 W AC power supply with integrated fan with rear-to-front airflow for 40- and 60-port Brocade VDX 6720 | FRU |
| XBR-000190 (1-pack) | 1 GbE copper | Optics |
| E1MG-SX-OM (1-pack)<br>E1MG-SX-OM-8 (8-pack) | 1000Base-SX | Optics |
| E1MG-LX-OM (1-pack)<br>E1MG-LX-OM-8 (8-pack) | 1000Base-LX | Optics |
| 10G-SFPP-SR (1-pack)<br>10G-SFPP-SR-8 (8-pack) | 10 Gbps SR | Optics |
| 10G-SFPP-LR (1-pack)<br>10G-SFPP-LR-8 (8-pack) | 10 Gbps LR | Optics |
| 10G-SFPP-TWX-0101 (1-pack)<br>10G-SFPP-TWX-0108 (8-pack) | 1 m Twinax copper cable | Optics |
| 10G-SFPP-TWX-0301 (1-pack)<br>10G-SFPP-TWX-0308 (8-pack) | 3 m Twinax copper cable | Optics |
| 10G-SFPP-TWX-0501 (1-pack)<br>10G-SFPP-TWX-0508 (8-pack) | 5 m Twinax copper cable | Optics |

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